



National Nuclear Security Administration
Office of the Second Line of Defense
MEGAPORTS INITIATIVE

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The Second Line of Defense (SLD) Megaports Initiative is a key component of a multi-agency, multi-layered, defensive network that strengthens the overall capability of partner countries to deter, detect, and interdict illicit trafficking in special nuclear and other radioactive materials at key international seaports. This program is part of the Office of International Material Protection and Cooperation in the U.S. Department of Energy's National Nuclear Security Administration (DOE/NNSA).

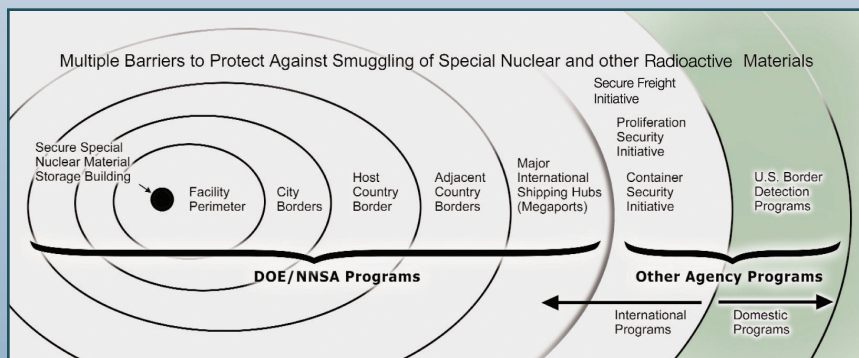
Overview

The Megaports Initiative works with foreign customs, port operators, and/or other relevant entities in partner countries to systematically enhance detection capabilities for special nuclear and other radioactive materials in containerized cargo transiting the global maritime shipping network. In support of this mission, the Megaports Initiative helps partner countries equip major international seaports with radiation detection equipment and alarm communication systems. In addition, the Megaports Initiative provides comprehensive training for foreign personnel, short-term maintenance coverage, and technical support to ensure the long-term sustainment and viability of installed radiation detection systems.

In addition to its international partners, Megaports collaborates with the U.S. Department of Homeland Security's Customs and Border Protection (CBP) and Domestic Nuclear Detection Office (DNDO), and the U.S. Department of State to counter nuclear and radiological threats to the U.S. and its international partners by installing radiation portal monitors that can be used by CBP officers to scan high-risk U.S.-bound containers.

The goal of the Megaports Initiative is to scan as much container traffic as possible (including imports, exports, and transshipped containers) regardless of destination and with minimal impact to port operations. The Megaports Initiative seeks to equip 100 seaports with radiation detection systems by 2015, scanning approximately 50 percent of global maritime containerized cargo.

DOE/NNSA programs combine with Department of Homeland Security and other U.S. and inter-governmental efforts to protect the U.S. homeland against threats from illicit movement of special nuclear and other radioactive materials.



Rail radiation portal monitor (RPM) at the Port of Antwerp, Belgium

Addressing the Threat

The vitality of most national economies hinges upon global trade. Over 90% of global commerce is transported through the maritime shipping network via cargo containers. More than 450 million twenty-foot-equivalent containers (TEUs) transit the globe annually through the maritime domain. The global ambitions of terrorist organizations in today's world has raised the concern that terrorists or states of proliferation concern may attempt to exploit containerized cargo to covertly transport nuclear and other radioactive materials

“Our programs are structured in support of multiple layers of defense against nuclear terrorism and state-sponsored nuclear proliferation. This multi-layered approach is intended to identify and address potential vulnerabilities within the international nonproliferation regime, to limit terrorists’ access to deadly weapons and material, and to prevent the illicit trafficking of dangerous materials that could be used in a nuclear or radiological weapon.”

– David Huizenga, Assistant Deputy Administrator, Office of International Material Protection and Cooperation, National Nuclear Security Administration, testimony before the Senate Committee on Commerce, Science, and Transportation Subcommittee on Surface Transportation and Merchant Marine Infrastructure, Safety, and Security, June 2008

or use it to deliver a nuclear weapon or a radiological dispersal device (RDD). The Megaports strategy is based on the assumption that adversaries have the least control over illicit nuclear and other radioactive materials during the transport stage. The deployment of radiation detection systems also deters nuclear smugglers from using the maritime shipping network, forcing them to turn to other, more easily interdicted, means of transportation.

Implementing the Program

The Megaports Initiative is implemented by DOE/NNSA with support from DOE National Laboratories and qualified design, engineering, and construction contractors. The Megaports Initiative pursues cost-sharing with partner countries, where possible, for the design and installation of the radiation detection systems.

Port Prioritization & Engagement – To select key ports for engagement, a Maritime Prioritization Model (MPM) was developed that considers both the volume of container traffic at the port and the threat and/or strategic location of the port. In prioritizing ports of interest, the MPM factors in the percentage of scannable volume at the port; the origin and destination of container cargo movement through a port; the likelihood that nuclear material might be smuggled through a port; and the country's willingness to participate in the program. DOE/NNSA personnel engage the foreign governments of selected ports of interest to participate in the Megaports Initiative, which is typically formalized by signing a bilateral agreement.

Planning & Implementation – The Megaports Initiative makes a concerted effort to implement the program in a manner that stems proliferation threats without disrupting the flow of commerce. Throughout the design phase, Megaports personnel coordinate closely with terminal operators and port authorities,



Mobile Radiation Detection and Identification System (MRDIS) at the Port of Salalah, Oman

foreign customs officials, and other stakeholders to ensure that the placement of radiation detection equipment and the operational procedures developed to respond to radiation alarms minimize impact to port operations. The goal of the Megaports Initiative is to scan as many containers as possible, including imports, exports, and transshipped containers, regardless of destination. Imports and exports are typically captured by installing radiation detection equipment at the entrance and exit gates of port facilities. Scanning transshipped containers can be challenging and often requires innovative solutions. U.S. contractors selected by DOE/NNSA oversee construction and installation of the Megaports systems after the detailed design has been accepted by all stakeholders. When cost-sharing, the partner nation typically funds the design, construction, and installation of the Megaports systems with assistance from U.S. engineers and construction experts.

Training & Sustainment – The Megaports Initiative trains partner nation officials to operate and maintain the systems, and helps partner countries establish an indigenous training capability to ensure system operators and maintenance personnel

Partnering with Homeland Security

The Department of Homeland Security (DHS) has several programs directly related to radiation detection and maritime security. DOE/NNSA has established strong, synergistic ties with DHS's CBP.

- CBP's Container Security Initiative (CSI), which handles over 85% of container cargo coming into the U.S., is active at 58 ports, many of which are operational Megaports or ports of interest. The Megaports Initiative collaborates with CBP where Megaports and CSI overlap to improve CSI inspection teams' ability to identify high-risk U.S.-bound containers. The Megaports Initiative has committed to providing a radiation detection capability to all CSI ports to serve as an additional screening tool in assessing high-risk containers.
- DOE/NNSA and CBP are jointly implementing the Secure Freight Initiative (SFI), the goal of which is to scan 100% of U.S.-bound containers with radiation detection and imaging systems at select foreign ports. The Megaports Initiative provides radiation portal monitors (RPMs) with Optical Character Recognition (OCR) technology, communications systems, and integrated RPM/imaging data for CBP personnel at SFI ports.

have the requisite knowledge and technical proficiency to support the long-term operation of the installed systems. The training plan often includes technical classes held at DOE/NNSA's HAMMER Training Center in Richland, WA. The supply of preventative maintenance and emergency repair support, critical spare parts, data analysis support, and system performance testing are other important elements of the sustainment approach employed by the Megaports Initiative. Under most Megaports agreements, DOE/NNSA commits to providing sustainment assistance for three years, after which time the partner country takes full responsibility for operating and maintaining the systems.

Secondary Inspection and Identification Equipment



Spectroscopic portals

Handheld Equipment

- Personal Radiation Detectors (PRDs)
- Radioisotope Identification Devices (RIIDs)
- Radiation Survey Meters
- High Purity Germanium Detectors



Personal Radiation Detector



TSA Survey Meter



Thermo IdentiFINDER



Germanium-based ORTEC Detective

Transshipment

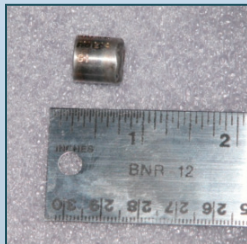
Whereas gate traffic can be easily captured by taking advantage of existing chokepoints into and out of a port, transshipped cargo continues to present a significant challenge for Megaports implementation. Because of shorter dwell times for containers, space constraints, lack of shipping data, and the difficulty of identifying non-disruptive permanent RPM sites within terminals, capturing transshipments without seriously impacting port operations often requires new and creative solutions. DOE/NNSA has been innovative in its technological approach to scanning transshipped containers where permanent RPM installations are not possible due to terminal configurations:

- A prototype Radiation Detection Straddle Carrier (RDSC) was developed to scan rows of containers stacked up to three high. The prototype consists of an off-the-shelf straddle carrier that has been stripped of its lifting mechanisms and reconfigured with radiation and spectroscopic monitors. The RDSC was successfully piloted in Freeport, Bahamas, where it was proven capable of scanning 85% of transshipment containers. Subsequently, DOE/NNSA awarded a contract to build additional systems to be deployed to ports that primarily rely on straddle carriers for container movement.
- The Mobile Radiation Detection and Identification System (MRDIS) consists of radiation and spectroscopic monitors mounted on a mobile, self-propelled frame. The MRDIS can relocate to scan containers as they are transferred between ships or to the container stacks. Once parked, the MRDIS is used in the same manner as permanent RPMs. The MRDIS is being piloted at the Port of Salalah, Oman. Additional systems will be built in the future to be deployed to heavy transshipment ports.
- DOE/NNSA, in close partnership with CBP and DND, is analyzing the integration of radiation detection technology into spreader-bar equipment used to lift containers. DOE/NNSA and CBP conducted testing at the Ports of Tacoma and Oakland, and Los Alamos National Laboratory (LANL). DOE/NNSA, CBP, and DND continue to evaluate the effectiveness of spreader-bar-based detection technologies in scanning transshipped containers.



Prototype RDSC at the Port of Freeport, Bahamas

The radiation detection systems deployed under the Megaports Initiative better equip partner countries to detect radiation, respond to alarms, and safely recover improperly-disposed radioactive sealed sources and/or disposition contaminated scrap metal. The following photos are examples of real detections using Megaports equipment that required response from partner countries.



AmBe source



Stainless steel contaminated with Co-60



Scrap metal contaminated with Ra-226



Cs-137 source in shielding

Looking Ahead: 2010 and Beyond

Looking ahead, the Megaports Initiative will:

- Install radiation detection equipment at 100 ports, scanning approximately 50% of global container traffic by 2015.
 - Complete 14 ports in FY10, bringing the cumulative number of operational Megaports to 41.
- Initiate new partnerships and establish formal agreements for Megaports cooperation.
- Provide mobile detection systems to select transshipment ports.
- Develop response protocols with select nations to address nuclear and radiological threats.
- Provide training to partner nation officials, helping to ensure appropriate use and long-term sustainment of the systems.
- Provide specialized equipment and/or training to select ports to enhance partner nation capability for detection, response, and recovery efforts.
- Transition operational Megaports to partner nation officials after the sustainment transition period.

Megaports Progress to Date



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